

Mass-Optimized Ultra Flex Solar Array with Integrated IMM Cell Flexible Blanket, Phase II

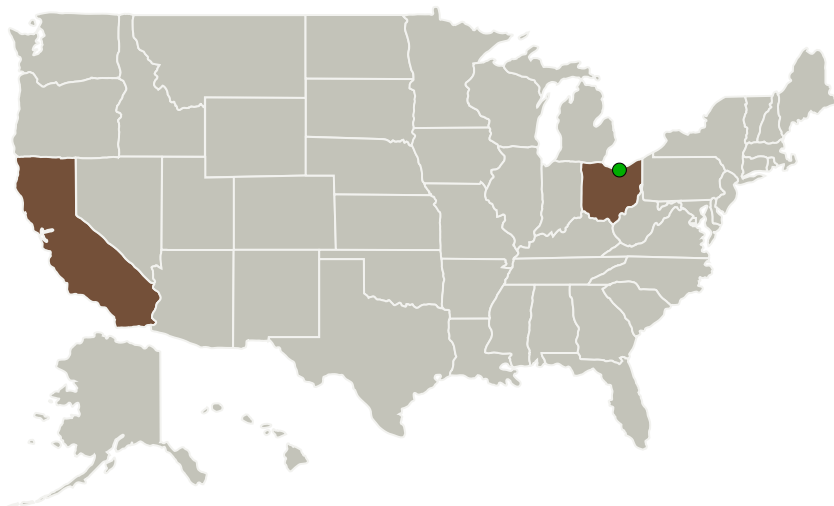
Completed Technology Project (2011 - 2013)



Project Introduction

Deployable Space Systems (DSS), in partnership with ATK Space and EMCORE, is focusing on the design development and optimization of the most promising advanced space photovoltaic subsystem now available: EMCORE's ultra-thin 33% BOL-efficient Inverted Metamorphic Multijunction (IMM) solar cell that is interconnected into module form and integrated onto an advanced flexible blanket (gore); specifically for implementation on the lightest solar array structural system currently in use, ATK's UltraFlex. The innovative and synergistic solutions conceptually developed during the Phase 1 effort produced a near-term, low-risk solar array system that provides breakthrough performance in terms of highest specific power (>380 W/kg BOL), light weight, scalability to large (>15 kW) wing sizes, high deployed stiffness, high deployed strength, compact stowage volume (>40 kW/m³ BOL), high voltage operation capability, reliability, affordability, and rapid commercial readiness. The Phase 2 study will successfully further increase the design fidelity (TRL) of the most promising IMM-integrated onto UltraFlex-specific triangular gore blanket solutions configured to meet key high-voltage SEP / deep space science mission requirements. The development, as performed on the cost-effective Phase 2 SBIR plan structured in detail, will allow for an expedient and low-risk commercial infusion of the ultra-lightweight integrated IMM PV UltraFlex solar array technology via continued hardware-based and test-validated development, and enables future missions, including near-to-medium term NASA Outer Planets and Solar Electric Propulsion (SEP) science missions.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Deployable Space Systems, Inc(DSS)	Lead Organization	Industry	Goleta, California
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
California	Ohio

Project Transitions

**June 2011:** Project Start**November 2013:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139203>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Deployable Space Systems, Inc (DSS)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

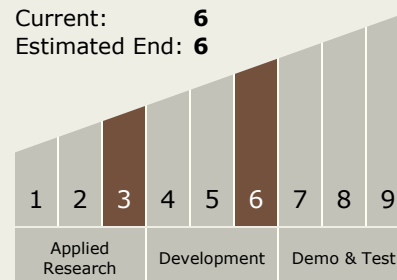
Steve White

Technology Maturity (TRL)

Start: 3

Current: 6

Estimated End: 6



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.1 Photovoltaic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System